

LOBLOLLY PINE DIE-OFF STATUS REPORT

by

Ralph E. Miller^{1/}INTRODUCTION

In 1959, National Forest personnel from the Talladega National Forest in Alabama observed a deterioration of loblolly pine on the Oakmulgee and Tuscaloosa Districts. The deterioration was characterized by symptoms which included thin crowns caused by premature loss of previous years' needles, needle discoloration, shortened needles, and tree mortality. Affected trees were 50 years and older with diameters greater than 15 inches, and were generally interspersed among apparently healthy trees. Initial reports estimated that 200,000 acres were affected with 20,000 acres experiencing mortality of 75+ board feet per acre.

The following year the affected areas were examined by E. R. Roth, P. Lightle, and J. Fox, Pathologists, and R. K. Smith, Entomologist. Conclusions made in a report by Roth (1960) were that 1) root deterioration had occurred prior to symptom expression, 2) Fomes annosus was present but not responsible for most of the damage, and 3) Littleleaf disease caused by Phytophthora cinnamomi was not responsible.

Subsequent visits by Forest Service Pathologists produced the following conclusions: 1) affected trees decrease in diameter growth, 2) dry sites are affected as much as wetter sites, 3) the loblolly pine is off site in some of the affected areas, 4) heavy cone crops are produced prior to tree death, and 5) insects were not found associated with the die-off. It was felt that further evaluation was warranted in order to determine the causative agent(s) and to study the disease progress.

EVALUATIONS CONDUCTED

Soil samples were collected for isolation work, nematode analysis, and soil analysis, by various research pathologists in 1965. Additionally, a survey for sporophores (mushrooms) of Fomes annosus was conducted by S&PF pathologists to determine the abundance of the fungus.

^{1/} Pathologist, USDA, Forest Service, Southeastern Area, State and Private Forestry, Pineville, LA.

A five-year evaluation was initiated in 1966 with the establishment of 24 one-quarter acre plots, 12 on dry sites and 12 on moist sites. Data were collected on dominant and co-dominant trees in all plots. This included: needle color, needle length, and needle retention. From the data, trees were classified into one of five condition classes. By taking readings annually for five years, a study of disease progress was made.

RESULTS -

Isolation work for Fomes annosus, Phytophthora cinnamomi and Pythium spp. showed that these pathogens were present to a minor degree and could be isolated from healthy trees, as well as affected trees. The F. annosus sporophore survey showed that 3 of 338 trees in the die-off categories had sporophores. The nematode analysis was negative, but the soil analysis showed that in several of the die-off plots loblolly pine was not the best adapted species for that particular soil type, possibly a contributing factor.

In 1971, a final reading was made of the 24 plots. Six of the plots showed no change, 13 were in better condition, and 5 were in worse condition than in 1966. Individually, 179 trees improved, 53 remained unchanged, and 96 had become worse. Fourteen trees died of causes that could not be attributed to any pathogen or insect and were assumed to have died from the unknown die-off condition. The loss to this condition was determined to be less than 1 percent per year.

CONCLUSIONS -

1. No organism was isolated consistently enough to indicate a fungus was involved.
2. No insects were found to be associated with the die-off trees.
3. Some of the plots had soil types less favorable for loblolly pine.
4. The 1 percent mortality per year was not unusual.
5. Most of the trees appeared to have improved, indicating that the die-off might have been caused by some unusual physiological or environmental condition(s) that have moderated or disappeared.

MANAGEMENT RECOMMENDATIONS -

The following management recommendations were made as a result of the evaluation:

1. Reduce the rotation age of loblolly pine from 70 to 60 years in the affected areas.
2. Maintain a basal area of 60-70 square feet per acre of pine in "die-off" stands.
3. Regenerate to longleaf pine those sites that were severely affected.
4. Maintain present hardwood areas, and where "die-off" is a problem, convert to hardwoods if the site permits.
5. Keep salvage operations to a minimum because continuous stand disturbance tends to increase problems like Fomes annosus, bark beetles, and erosion.

With the exception of #1, these have all been incorporated in the Talladega National Forest Timber Management Plans.

FUTURE ACTIVITY

1. Visit Alabama National Forest Timber Staff to:
 - a. Get an estimate of volume loss due to loblolly "die-off."
 - b. Identify compartments and stand locations having affected trees.
2. Review current management recommendations.
3. Review implementation of the management recommendations on the Talladega National Forest.
4. If justified, and a need exists, update the last incidence and loss survey.